5 YEAR WARRANTY

MADE IN USA

User's Guide

Shop online at

omega.com®

OMEGA®

omega.com
e-mail: info@omega.com

For latest product manuals:
omegamanual.info

ISO 9001 CERTIFIED CORPORATE QUALITY — STAMFORD, CT

ISO 9001 CERTIFIED CORPORATE QUALITY — MANCHESTER, UK

CSi32
Benchtop Controller

omega.com®
OMEGA®

OMEGAnet® Online Service omega.com	Internet e-mail info@omega.com

Servicing North America:

U.S.A.:
ISO 9001 Certified

Omega Engineering, Inc., One Omega Drive, P.O. Box 4047
Stamford, CT 06907-0047 USA
Toll Free: 1-800-826-6342 TEL: (203) 359-1660
FAX: (203) 359-7700 e-mail: info@omega.com

Canada:

976 Bergar
Laval (Quebec), H7L 5A1 Canada
Toll-Free: 1-800-826-6342 TEL: (514) 856-6928
FAX: (514) 856-6886 e-mail: info@omega.ca

For immediate technical or application assistance:

U.S.A. and Canada: Sales Service: 1-800-826-6342/1-800-TC-OMEGA®
Customer Service: 1-800-622-2378/1-800-622-BEST®
Engineering Service: 1-800-872-9436/1-800-USA-WHEN®

Mexico/ Latin America:

En Español: 001 (203) 359-7803 FAX: 001 (203) 359-7807
info@omega.com.mx e-mail: espanol@omega.com

Servicing Europe:

Benelux:

Managed by the United Kingdom Office
Toll-Free: 0800 099 3344 TEL: +31 20 347 21 21
FAX: +31 20 643 46 43 e-mail: sales@omegaeng.nl

Czech Republic:

Frystatska 184
733 01 Karviná, Czech Republic
Toll-Free: 0800-1-66342 TEL: +420-59-6311899
FAX: +420-59-6311114 e-mail: info@omegashop.cz

France:

Managed by the United Kingdom Office
Toll-Free: 0800 466 342 TEL: +33 (0) 161 37 29 00
FAX: +33 (0) 130 57 54 27 e-mail: sales@omega.fr

Germany/Austria:

Daimlerstrasse 26
D-75392 Deckenpfronn, Germany
Toll-Free: 0800 6397678 TEL: +49 (0) 7056 9398-0
FAX: +49 (0) 7056 9398-29 e-mail: info@omega.de

United Kingdom:
ISO 9001 Certified

OMEGA Engineering Ltd.
One Omega Drive, River Bend Technology Centre, Northbank
Irlam, Manchester M44 5BD United Kingdom
Toll-Free: 0800-488-488 TEL: +44 (0) 161 777-6611
FAX: +44 (0) 161 777-6622 e-mail: sales@omega.co.uk

It is the policy of OMEGA Engineering, Inc. to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, human applications.

Table of Contents

Section ..... Page

Section 1 Introduction 1
1.1 Precautions 1
1.2 Safety Warnings and IEC Symbols 1
1.3 Statement on CE Marking 2
1.4 Available Models 2

Section 2 Installation 3
2.1 Unpacking and Inspection 3
2.2 Power Connection 3

Section 3 Operation 4
3.1 Front Panel Controls and Indicators 4
3.2 Rear Panel Connection (Thermocouple Models) 4
3.3 Rear Panel Connection (RTD, MV, MA Models) 5
3.4 Controller Settings and Programming 6

Section 4 RS232/485 Communication 7
4.1 Cable Connections 7
4.2 Software 7
4.3 Settings/Programming 7

Section 5 Maintenance 8
5.1 Calibration 8
5.2 Cleaning 8
5.3 Fuse Replacement 8

Section 6 Troubleshooting 9
6.1 Troubleshooting 9

Section 7 Specifications 10
7.1 Benchtop Configuration 10
7.2 Controller Model CNi32 Specifications 10

List of Figures

Figure Description: ..... Page

1. IEC Symbols 1

2. Available Models 2

3a. Front Panel (108 to 125 Vac Models) 4

3b. Rear Panel (Thermocouple Models) 4

3c. Rear Panel (RTD Models) 5

3d. Rear Panel (MV and MA Models) 5

4. Internal Wiring - Benchtop Controller 7

Section 1 - Introduction

Your CSi32 series benchtop controller is ideal for laboratory use and applications requiring portable temperature or process control. Pre-wired input and output receptacles on the rear panel enable quick and easy connections to main ac power, signal input, control output and two way digital communications. These controllers are factory configured and calibrated for a dedicated input type by model number. It is important that you read this manual and controller manual number M3355 completely and follow all safety precautions in both manuals before operating this unit.

1.1 Precautions

- FOLLOW ALL SAFETY PRECAUTIONS AND OPERATING INSTRUCTIONS OUTLINED IN THIS MANUAL.
- KEEP OUT OF REACH OF ALL CHILDREN.
- DO NOT OPERATE IN FLAMMABLE OR EXPLOSIVE ENVIRONMENTS.
- NEVER OPERATE WITH A POWER CORD OTHER THAN THE ONE PROVIDED WITH YOUR UNIT.
- REMOVE AND OR DISCONNECT MAIN POWER CORD BEFORE ATTEMPTING ANY MAINTENANCE OR FUSE REPLACEMENT
- DO NOT CONNECT AND OR OPERATE THIS UNIT TO AN NON-GROUNDED, NON-POLARIZED OUTLET OR POWER SOURCE.
- DO NOT RECONFIGURE THE INPUT TYPE FACTORY SET IN THE CONTROLLERS PROGRAM. INCORRECT READINGS AND/OR CONTROL MAY RESULT.

NOTE:

There are no user serviceable parts inside your unit. Attempting to repair or service your unit may void your warranty.

1.2 Safety Warnings and IEC Symbols

This device is marked with international safety and hazard symbols in accordance with IEC 1010. It is important to read and follow all precautions and instructions in this manual before operating or commissioning this device as it contains important information relating to safety and EMC. Failure to follow all safety precautions may result in injury and or damage to your calibrator. Use of this device in a manor not specified by the manufacturer may impair protection provided within the unit.

IEC symbols	Description
	Caution, risk of electric shock
	Caution, refer to accompanying documents

Figure 1. IEC Symbols

1.3 Statement on CE Marking

It is the policy of OMEGA® to comply with all world-wide safety and EMI/EMC regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon verification of compliance.

1.4 Available Models

AVAILABLE MODELS	INPUT TYPE	CONTROL OUTPUT	TEMPERATURE RANGE
CSi32J	J	DUAL 5 AMP SSR	-210 to 760°C/-346 to 1400°F
CSi32K	K		-270 to 1372°C/-454 to 2502°F
CSi32E	E		-270 to 1000°C/-454 to 1832°F
CSi32T	T		-270 to 400°C/-454 to 752°F
CSi32R	R		-50 to 1788°C/-58 to 3250°F
CSi32S	S		-50 to 1768°C/-58 to 3214°F
CSi32RTD	RTD		-200 to 900°C/-328 to 1652°F (Pt,0.00385, 100, 500, 1000Ω) -200 to 850°C/-328 to 1562°F (Pt,0.00392, 100, 500, 1000Ω)
CSi32MV	MV		0 to 100mV, 0 to 1V, 0 to 10Vdc
CSi32MA	MA		0 to 20mA, 4 to 20mA

Figure 2. Available Models

Section 2 - Installation

2.1 Unpacking

Remove the packing list and verify that you have received all your equipment. If you have any questions about the shipment, please call our Customer Service Department at **1-800-622-2378** or **203-359-1660**. We can also be reached on the Internet at **omega.com**, e-mail: **info@omega.com**

When you receive the shipment, inspect the container and equipment for any signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE:

The carrier will not honor any damage claims unless all shipping material is saved for inspection. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

The following items are supplied in the box:

- CSi32 Series benchtop Controller (1 each)
- This Users Guide and Controller Manual #M3355, iSeries Temperature & Process Controllers (1 each)
- Power Cord (1 each)
- Mating Input Connector(s), Thermocouple Model (1 each) standard OST Series male and (1 each) miniature SMP Series male.
- DB9-R12 Cable/Adaptor (1 each) Communication models only.
- Communications Manual #M3397 (1 each) Communications models only.

2.2 Power Connection

2.2.1 108 to 125 Vac, 50/60 Hz Model

Your Benchtop Controller comes with a standard North American 3-prong AC power cord. Do not use any other power cord other than the one provided. This cord provides the proper grounding and has been safety tested by the proper safety agencies.

CAUTION:

Electrical connections and wiring should be performed only by suitably trained personnel.

Section 3 - Operation

3.1 Front Panel Controls, Indicators and Connections

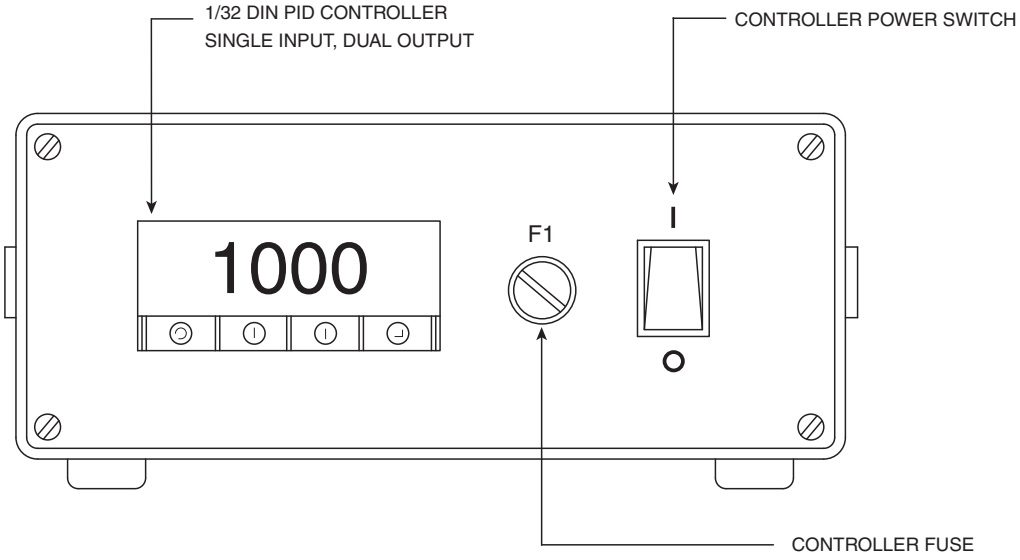

Figure 3a. Front Panel (108 to 125 Vac Models)

3.2 Rear Panel (Thermocouple Models)

NOTE:

The Universal Thermocouple Panel Jack Shown is patented.

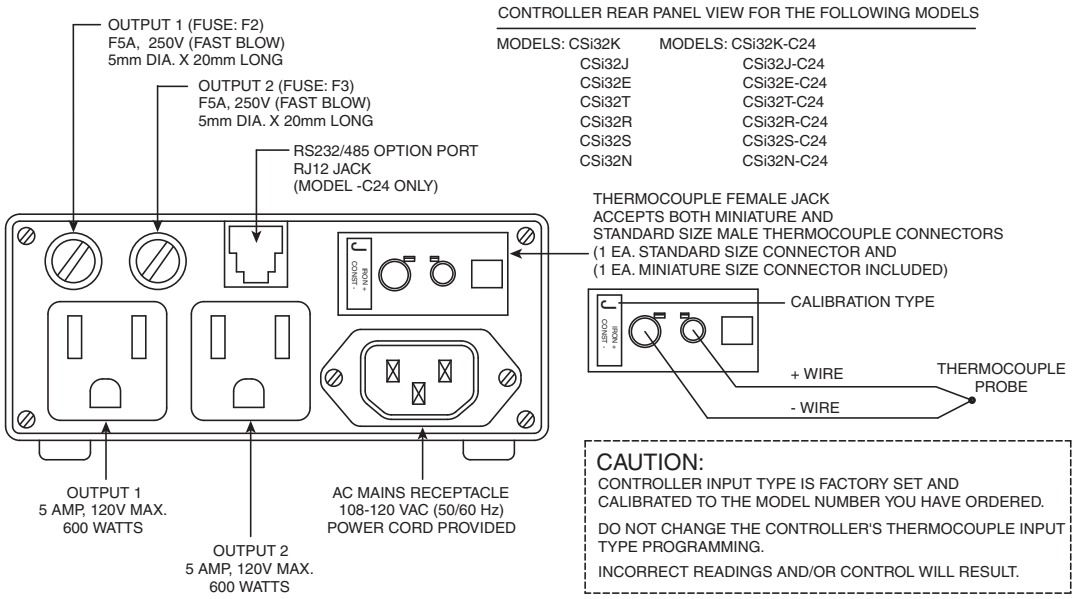

Figure 3b. Rear Panel (Thermocouple Models)

3.3 Rear Panel (RTD, MV, MA Models)

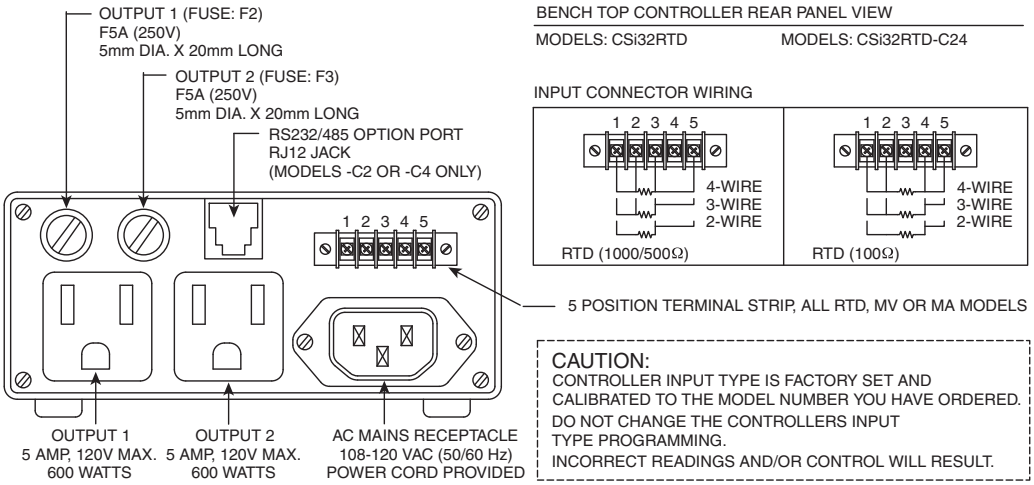

Figure 3c. Rear Panel (RTD Models)

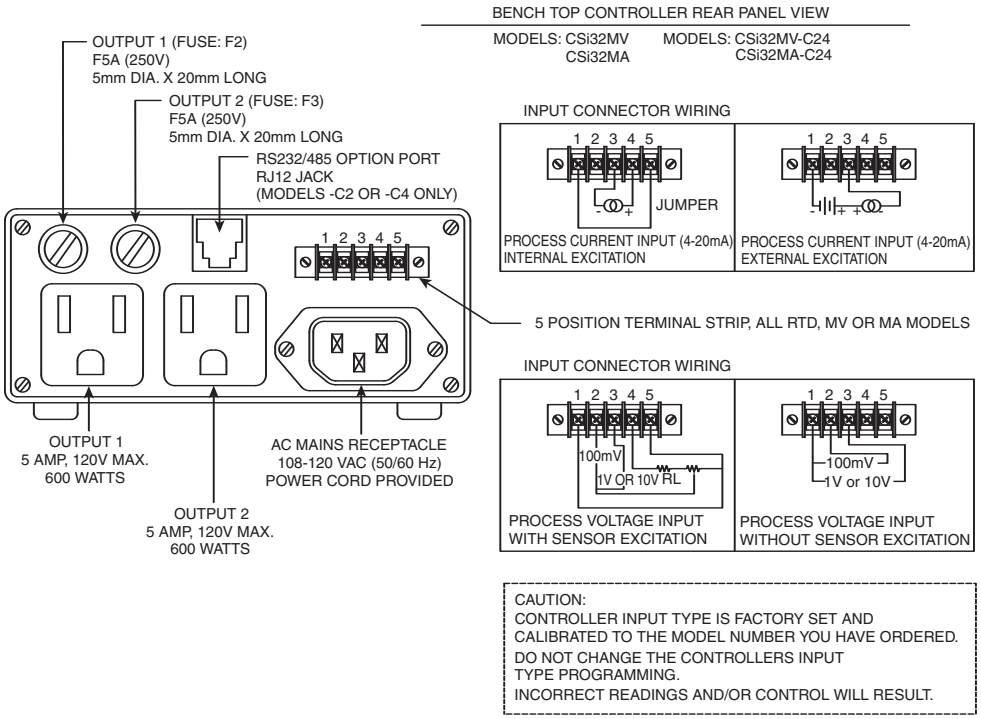

Figure 3d. Rear Panel (MV and MA Models)

3.4 Controller Setup and Programming

3.4.1 Input Type Setup

No setup or programming is required. Your unit has been manufactured, programmed and calibrated for the input type you ordered by model number.

Do not change or reprogram the controllers input type. Incorrect readings and/or control will occur.

3.4.2 Output Type Setup

No setup or programming is required. Your unit has been manufactured and programmed for dual dc pulse outputs to drive the internal dual solid state relay built into your unit. Do not change or reprogram the controller's output type. Incorrect control and/or damage to your unit may occur.

3.4.3 Changing the Temperature/Process Setpoint

The CSi32 incorporates a PID digital setpoint controller. In the default mode the digital display indicates the temperature or process known as (PV) Process Variable. Pushing the "MENU" key once causes the display to show SP1. With SP1 on the display press the "ENTER" key to show the current programmed setpoint known as (SV) Setpoint Variable. To make changes to the setpoint press the "INCREASE" or "DECREASE" key followed by "ENTER" to store the change. In this mode, holding the "INCREASE" or "DECREASE" key for an extended period will cause the setpoint to advance more rapidly the longer you hold it.

You can adjust SP2 by following the same procedure or just press "DECREASE" to reset the controller with your new setpoint.

Menu Key
Press to access setpoint.

Decrease Key
Press to decrease setpoint.

Increase Key
Press to incecrease setpoint.

Enter Key
Press to store changes in setpoints.

3.4.4 All Other Settings and Programming.

For all other settings such as Units, Decimal, Setpoint, Autotune, Control Parameters and Communication, refer to the controller's manual (M3355), iSeries Temperature/Process Controllers. For -C24 (RS-232 or RS-485) models with the communication option refer to the communication manual (M3397) for settings and programming. Or use the iSeries configuration software.

Section 4 - RS-232 or RS-485 Communication (Optional)

4.1 Communication Cable Connections

Your controller unit has been factory pre-wired and configured for ease of use with an RJ12 rear panel connection that will requires no additional wiring. An interface cable, Part No. DB9-R12 is included with your unit for easy connection between your benchtop controller and PC.

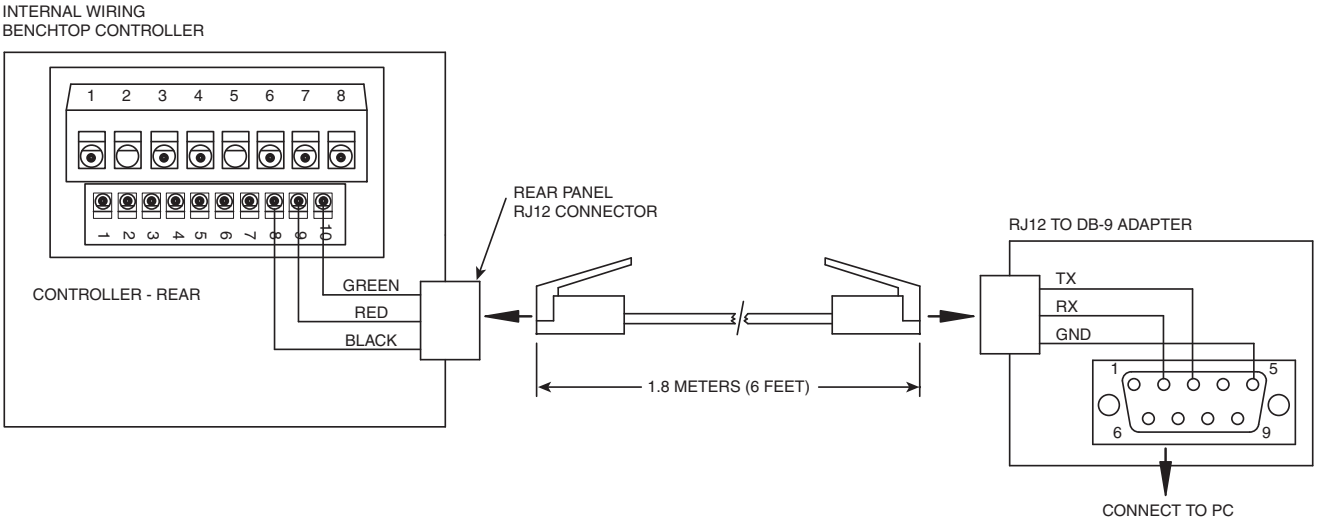

Figure 4. Internal Wiring - Benchtop Controller

4.2 Communication Software

Benchtop controllers with the –C24 option come complete with communication software for configuration. The software is designed to interface with your benchtop controller when the optional communication hardware has been factory installed in your unit.

Note: The iSeries configuration software is Windows® 95/98/2000/NT/XP compatible.

4.3 Communication Settings and Programming

Refer to the Software Communication Manual (M3397) for factory default settings and for making changes to the communication settings and programming.

Section 5 - Maintenance

5.1 Calibration

This unit has been fine tuned and factory calibrated to give optimum performance over its full operating range for the input type you have selected by model number. It is recommended that the unit be returned annually for recalibration.

CAUTION:

Remove all electrical connections and power before attempting any maintenance or cleaning

5.2 Cleaning

Lightly dampen a soft clean cloth with a mild cleaning solution and gently clean the benchtop controller.

5.3 Fuse Replacement

WARNING:

Disconnect all power from source before attempting fuse replacement.

CAUTION:

For continued protection against the risk of fire, replace fuses with only the same size, type and rating indicated here and on the rear panel of your unit.

5.3.1 108 to 125 Vac, 50/60 Hz Models

Controller Power Fuse: (Front Panel) **F1**	1 each F.250A, 250 VAC, (Fast-Acting, 0.250 Amp) UL./CSA/VDE APPROVED (5mm dia. x 20mm long).
Output Fuse: (Rear Panel) **F2, F3**	2 each F5A, 250 VAC, (Fast-Acting, 5 Amp) UL./CSA/VDE APPROVED (5mm dia. x 20mm long).

Section 6 - Troubleshooting Guide

Problem	Solution
1. Unit will not turn on.	a. Check all electrical connections. b. Check front panel fuses. c. Unit requires service, contact our customer service department.
2. Unit turns on, but will not control	a. Check all electrical connections. b. Check rear panel fuses. c. Check that you have programmed and set all the correct parameters for your application. Ref. Manual No. M3355
3. Rear Panel Output Fuse(s) keeps blowing	a. Check all electrical connections. b. Check rear panel fuses for correct rating. c. Check that your output load does not exceed the 5 Amp (600 watts) maximum limit. d. Contact our application-engineering department for help.

Section 7 - Specifications

7.1 Benchtop Configuration

Accuracy	
Thermocouple Models: (J, K, T, E, R, S, N)	± 1.0°C
RTD, MA, MV Models:	± 0.03% of reading
Power	
Standard Models:	108 to 125 Vac, 50/60 Hz.
Input Connection	
Thermocouple Models: (J, K, T, E, R, S, N)	Universal Female Panel Jack (Patented) (Accepts both standard or miniature male thermocouple connector)
RTD, MA, MV Models:	5 Position terminal block with #3-48 Phillips-head screws. Accepts wire from 16 to 30 AWG.
Output Connection	
Outputs:	2
Output Rating	5 Amp (120 Vac) Max
Output Connections:	Standard 3-Prong Grounded
Enclosure	
Material:	Painted Aluminum
Size:	135 W x 59 H x 159 mm L (5.3 x 2.4 x 6.5")
Weight:	0.91 kg (2 lbs)

7.2 Controller Model CNi32 Specifications

See User Manual #M3355, iSeries Temperature & Process Controller for complete controller specifications and programming.

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **60 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **five (5) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

OMEGA is a registered trademark of OMEGA ENGINEERING, INC.

© Copyright 2011 OMEGA ENGINEERING, INC. All rights reserved. This document may not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form, in whole or in part, without the prior written consent of OMEGA ENGINEERING, INC.

Where Do I Find Everything I Need for Process Measurement and Control? OMEGA...Of Course!

Shop online at omega.com℠

TEMPERATURE

- Thermocouple, RTD & Thermistor Probes, Connectors, Panels & Assemblies
- Wire: Thermocouple, RTD & Thermistor
- Calibrators & Ice Point References
- Recorders, Controllers & Process Monitors
- Infrared Pyrometers

PRESSURE, STRAIN AND FORCE

- Transducers & Strain Gages
- Load Cells & Pressure Gages
- Displacement Transducers
- Instrumentation & Accessories

FLOW/LEVEL

- Rotameters, Gas Mass Flowmeters & Flow Computers
- Air Velocity Indicators
- Turbine/Paddlewheel Systems
- Totalizers & Batch Controllers

pH/CONDUCTIVITY

- pH Electrodes, Testers & Accessories
- Benchtop/Laboratory Meters
- Controllers, Calibrators, Simulators & Pumps
- Industrial pH & Conductivity Equipment

DATA ACQUISITION

- Data Acquisition & Engineering Software
- Communications-Based Acquisition Systems
- Plug-in Cards for Apple, IBM & Compatibles
- Data Logging Systems
- Recorders, Printers & Plotters

HEATERS

- Heating Cable
- Cartridge & Strip Heaters
- Immersion & Band Heaters
- Flexible Heaters
- Laboratory Heaters

ENVIRONMENTAL MONITORING AND CONTROL

- Metering & Control Instrumentation
- Refractometers
- Pumps & Tubing
- Air, Soil & Water Monitors
- Industrial Water & Wastewater Treatment
- pH, Conductivity & Dissolved Oxygen Instruments

M4640/0508